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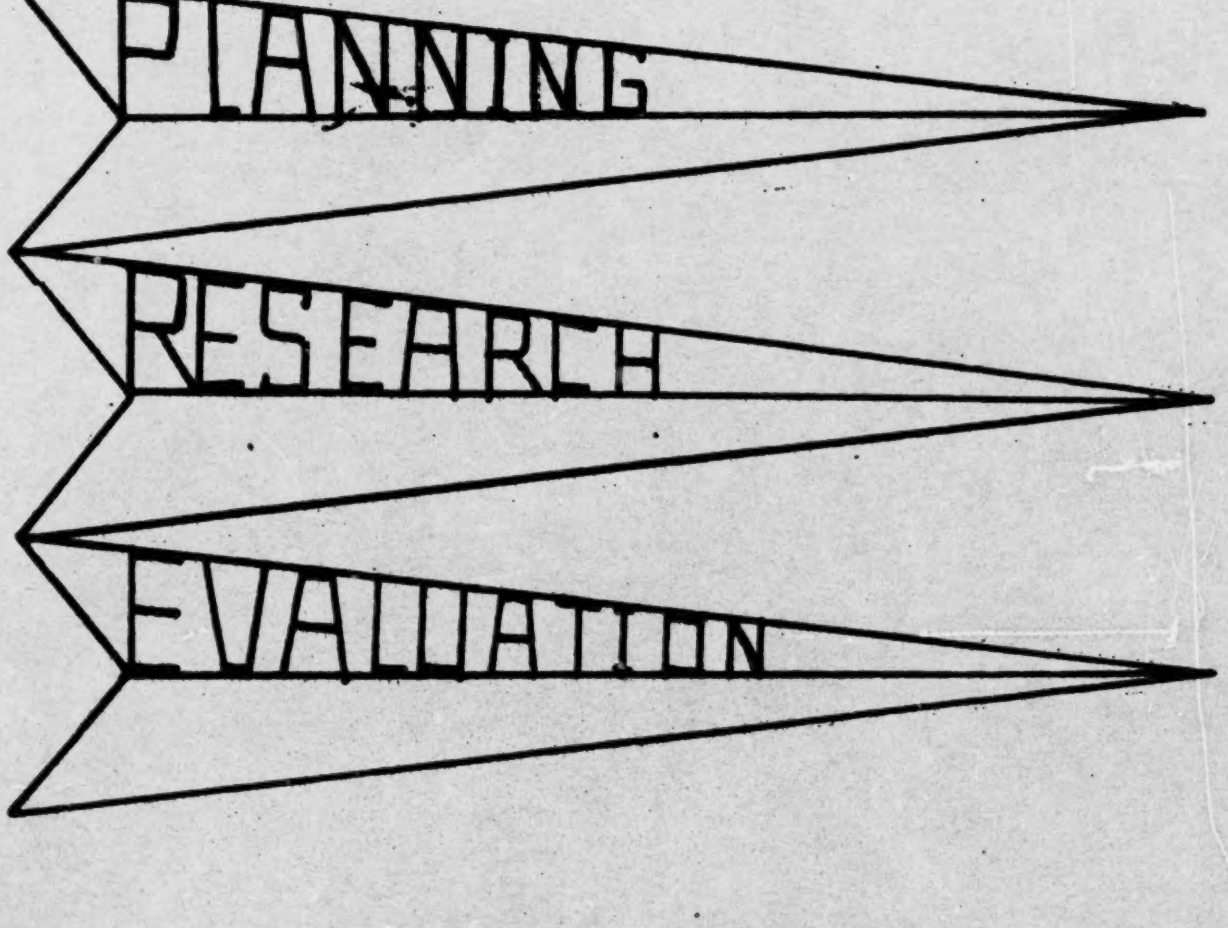
ABSTRACT

To evaluate the effectiveness of the Borg-Warner System 80 in seven Washington, D. C., schools, interviews, pupil progress records, questionnaires, and observational data were gathered on 103 students and their teachers. Two Borg-Warner programmed series, "Learning Letter Names" and "Reading Words in Context," were used in remedial and developmental reading instruction during the study. Data analyses revealed: (1) that pupils' attitudes toward reading became significantly more positive, (2) that both remedial and developmental students made significant gains in reading knowledge and improved reading habits (though the remedial group scored significantly lower than the developmental in the latter instance), (3) that significant increases in scores were achieved by the developmental students for "Learning Letter Names" and by the remedial students for "Reading Words in Context," and (4) that the initially high expectations teachers held for the technology were "to a great extent" realized for instruction in the alphabet and for teaching word recognition in context. (Author/RD)

ED 064706

AN EVALUATION OF THE BORG-WARNER SYSTEM 80 PROGRAM



Prepared by
The Departments of Research and Evaluation
Division of Planning, Research and Evaluation
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Final Evaluation Report

THE BORG-WARNER SYSTEM 80 PROGRAM
DECEMBER 1970 - MAY 1971

Departments of Research and Evaluation
Division of Planning, Research and Evaluation
Fiscal Year 1971

Public Schools of the District of Columbia

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TABLE OF CONTENTS

	Page
LIST OF TABLES AND FIGURES	ii
EVALUATION REPORT SUMMARY	iii
EVALUATION REPORT	1
Chapter	
I. Introduction	2
Background and Rationale	2
Purpose of the Study	3
II. Program Description	3
Program Objectives	3
Scope of the Program	4
Equipment and Materials	4
Training Workshops	5
Budget	5
III. Evaluation Procedure	5
Sample	5
Evaluation Plan	6
Delimitations	6
IV. Presentation and Analysis of Data	8
Data on the Students in the Sample	8
A. Reading Attitudes	9
B. Reading Knowledge	11
C. Reading Habits	12
D. Opinions About the Student Progress on Borg-Warner System 80	13
E. Student Progress on Borg-Warner Programmed Materials	15
F. Reading Level in Grade Equivalent	18
Data on the Borg-Warner System 80 Program as a Whole	21
A. Teachers Expectations for the System 80 Program	21
B. Teachers Final Evaluation of the System 80 Program	24
V. Summary and Conclusions	34
VI. Recommendations	37
VII. Appendicies	39
A. Expansion of Table 4, By Classes	40
B. Pupil Questionnaire	44
C. Student Checklist	46
D. Student Progress Record	49
E. Borg-Warner System 80 Training Workshop Questionnaire	51
F. Teacher Questionnaire, Final Evaluation	55

List of Tables and Figures

Table — Page

1. Evaluation Study Subjects By Grade, Sex, and Program 8
2. Changes in Reading Attitudes, Knowledges, and Habits of Sample Pupils, January to May, 1971 10
3. Sample Pupils Opinions About the Borg-Warner System 80 Program By Group 14
4. Reasons Given by Sample Pupils for Liking the Borg-Warner System 80 Program 14
5. Comparison of Pupils' Mean Errors on Borg-Warner System 80 Pre and Post Tests 16
6. Evaluation Study Subjects By Reading Levels, Pre and Post.. 18
7. Training Workshop Participants' Expectations for the Borg-Warner System 80 Program 22
8. The Extent to Which Information About the Borg-Warner System 80 was Disseminated at the Training Workshop..... 23
9. Pupil Use of Borg-Warner System 80 Audio-Visual Units, According to Participating Teachers 25
10. Teachers' Appraisal of the Extent to Which the Borg-Warner System 80 Meets Its Objectives..... 28
11. Teachers' Ratings of Operational Aspects of the Borg-Warner Program..... 30
12. Specific Strengths of the Borg-Warner System 80 According to Participating Teachers..... 31
13. Specific Weaknesses of the Borg-Warner System 80, According to Participating Teachers..... 32
14. Comments on the Borg-Warner System 80 From Participating Teachers 33

Figure

1. Pre-post Reading Levels of Subjects, By Group 20

BORG-WARNER SYSTEM 80 PROGRAM

Evaluation Report Summary

Title: Borg-Warner System 80 Program

Date: January to May, 1971

Target Population: Elementary pupils in schools scoring low on standardized reading tests. Primary pupils for developmental reading instruction, and intermediate pupils for remedial reading instruction.

Target Schools: The following schools were selected on the basis of their low reading scores on the September 1970 standardized tests:

J.F. Cook	Hendley	Lovejoy	Tyler
Crummell	Kenilworth	Madison	Walker-Jones
Eckington	Kingsman	Shadd	Webb
Emery	Langston		

Number Served: 600 to 800 pupils (estimate)

Sample Schools: The impact of the program was evaluated in the following seven schools:

J.F. Cook	Kingsman
Eckington	Tyler
Emery	Walker-Jones
Kenilworth	

Sample Population: 103 students from the seven sample schools were selected by systematic sampling procedures as subjects for this evaluation. Matched data on 83 of the sample students has been used in this report.

Background and Rationale:

The Borg-Warner System 80 is educational technology designed to supplement developmental and remedial reading programs on the primary level and to aid in the individualization of instruction. Four District of Columbia elementary schools participated in field-testing this technology for the Borg-Warner Corporation. Then, in December 1970, the Language Arts Department of the Division of Instruction purchased 54 Borg-Warner System 80 audio-visual units and 270 kits of accompanying programmed reading materials. The equipment arrived in the schools in January 1970. Much of it was placed

in the schools that had field-tested the System 80, so they could continue their comprehensive Borg-Warner program. In addition, 14 elementary schools who were selected on the basis of their poor September 1970 standardized test reading scores, received two Borg-Warner System 80 audio-visual units and 10 kits of accompanying programmed reading materials. The materials covered "Learning Letter Names" and "Reading Words in Context."

The purpose of this study is to examine the introduction of this technology into the schools which had had no prior contact with the System 80 in an effort to determine the effectiveness of the materials with the children who used them. It is hoped that from the experiences of these schools other schools will be able to decide whether the Borg-Warner System 80 technology could be a useful adjunct to their reading programs and to their efforts to raise the reading achievement level of children in the District of Columbia.

Objectives of the Borg-Warner System 80:

Major Objective: To build vocabulary and to develop beginning reading skills.

Specific Objectives:

1. To teach students to recognize the names of letters in the alphabet.

2. To teach recognition of the capital and small forms of the alphabet.

3. To provide a method for teaching and learning that is both self-motivating and enjoyable.

4. To create a desire and a love for reading on the part of the student.

5. To teach recognition of a fundamental vocabulary of approximately 200 service words and 100 high-frequency nouns in context.

    a. Words that appear frequently in most reading matter

    b. Words that appear frequently in most primary-level basal readers

6. To aid the teacher in individualizing reading instruction.

7. To aid in remedial as well as developmental reading.

8. To provide a tool that may be used in conjunction with any beginning reading program.

Program Description

The Borg-Warner System 80 technology is designed to provide a diagnostic/prescriptive approach to individualized instruction and is based on the learning principle that: 1) immediate and positive reinforcement facilitate learning; and, 2) systematic repetition and review help retention. The materials distributed to each of 14 selected schools were placed either in a self-contained classroom, usually a first or second grade, to supplement developmental reading programs, or in a reading center to aid remedial reading instruction.

Between January and May 1971 an estimated 600 to 800 pupils from classes in the 14 selected schools worked on the System 80 with programmed lessons from either the "Learning Letter Names" series or from the "Reading Words in Context" series.

Evaluation Plan:

To evaluate the Borg-Warner System 80 program, an evaluation team from the Departments of Research and Evaluation, Division of Planning, Research and Evaluation examined the impact of the program on a sample population selected systematically from seven of the 14 schools designated to receive Borg-Warner System 80 equipment. The evaluation team used the techniques of questionnaires, interviews, and observation to collect data on: 1) a sample of 103 pupils using the System 80, from both the pupils themselves and their teachers; and, 2) the program as a whole, from the teachers involved in its implementation. The children responded to questions about their attitudes toward reading in a pre-post interview, their teachers completed questionnaires about the pupils' reading knowledges and habits, their teachers kept progress records of the pupils' performances on the Borg-Warner System 80 pre-post tests for each kit of materials, and all the teachers using the equipment completed a final evaluation questionnaire.

The data was tallied and analyzed in the Departments of Research and Evaluation of the Division of Planning, Research and Evaluation. T-tests were computed on mean scores to determine whether statistically significant changes had occurred during the period between January and May 1971.

Findings:

1. Pupil Questionnaire: The pupils' attitudes toward reading became more positive between January and May 1971. The difference was statistically significant. There was no statistically significant difference between the attitudes of the developmental and remedial groups either at the beginning or the end of the study.

2. Student Checklist - Reading Knowledge: Both the remedial students and the developmental students made statistically significant gains in reading knowledge during the four months of the study. At the beginning of the study the difference in the reading knowledge of the remedial group and that of the developmental groups was statistically *significant, the remedial group being lower.* However, at the conclusion of the study there was no statistically significant difference between the two groups. Therefore, the remedial students made greater gains over the time period than did the developmental students in their reading knowledge.

3. Student Checklist - Reading Habits: The sample students made statistically significant improvements in their reading habits during the four months of the study. However, both at the beginning of the study and at the end, the remedial group scored lower than the developmental group by a statistically significant difference. While both groups improved their reading habits during the course of the evaluation, their gains were relative.

4. Student Progress Record: The increase in the scores of the developmental pupils from the pre to posttest of the "Learning Letter Names" series was statistically significant. The increases in the scores of the remedial group from the pre to posttest in Kits A, B, and C of the "Reading Words in Context" series were statistically significant.

5. Reading Workshop Questionnaire: The teachers scheduled to use the Borg-Warner System 80 equipment had high expectations for the technology prior to its introduction into their classrooms. They were favorably disposed to using the technology and thought they were well-equipped to integrate this tool for supplementary reading instruction into their reading programs.

6. Teacher Questionnaire, Final Evaluation: The teachers using the System 80 in their reading programs thought it had achieved "to a great extent" the goals set for it in terms of teaching the pupils the alphabet and the recognition of words in context. They indicated that they were pleased with the technology as a self-motivating and enjoyable teaching method and as a tool to be used in conjunction with any beginning reading program. While they thought it was an excellent way of individualizing instruction, they also thought the program would be more effective if: 1) aides were available to assist them; and 2) if programmed phonics materials were available to bridge the gap between the alphabet materials and the words in context materials.

Conclusions:

1. The Borg-Warner System 80 audio-visual unit and the accompanying kits of programmed reading materials became highly favorable influences in the reading environment of the pupils using it.

2. The Borg-Warner System 80 reading materials were useful supplementary teaching tools for both remedial and developmental reading instruction.

3. The alphabet materials of Kits A and B of the "Learning Letter Names" series are most suitable for children who already have some familiarity with the alphabet.

4. The "Reading Words in Context" series appears to have a greater effectiveness as a supplement to remedial reading instruction for intermediate students than as a supplement to developmental instruction in grades one and two.

5. A large gap exists between the skills needed for the "Learning Letter Names" series and the "Reading Words in Context" series, making it practically impossible for a pupil to progress from one to the other directly.

6. The administration of the Borg-Warner System 80 while not excessively time consuming can be distracting for the teacher while regular classroom lessons are in progress.

7. Some classroom teachers found it difficult to schedule pupils on the System 80 throughout the day. Continuous scheduling functioned more smoothly in the reading centers where pupils could come one by one throughout the day.

Recommendations:

1. Purchase of subject matter kits should be consistent with decisions about the use of the machines. For example, if a school wants to use the machines to supplement developmental reading at the primary level, the evidence here would support the purchase of the alphabet series and the phonics series. If, however, instruction is at the intermediate level, then the word series would appear to be the most functional.

2. Schools using the "Learning Letter Names" series for developmental reading instruction in the primary grades should consider purchasing the kits of phonics material now available from the Borg-Warner Corporation to follow the alphabet series and precede work in the "Reading Words in Context" series.

3. Programmed materials designed to develop specific reading skills, such as spelling, should be examined by teachers using the equipment, especially those working with remedial students.

4. Distribution of System 80 equipment in a school should allow for a maximum usage of the technology.

    a. The audio-visual units could be placed in a central location for remedial instruction or in a first grade classroom for developmental instruction in those cases where the children are already able to cope with the alphabet discriminations.

    b. Equipment might be shared between primary and intermediate classrooms where the teachers choose to use the machines for only part of the day. A first grade teacher might conduct a developmental program with the alphabet or phonics kits, while a fourth grade teacher might wish to use the equipment for remedial instruction with the word series -- both on a parttime basis.

5. A more effective system of repairing equipment should be devised so machines do not stand idle for months before repairs are made.

6. If at all possible aides should be made available to assist teachers using the Borg-Warner System 80, whether in the self-contained classrooms or in reading centers. These aides could be intermediate students, pupil peers, parent volunteers, or paraprofessionals. For example, an intermediate remedial student, familiar with the System 80, could assist a primary teacher with her developmental program. Some orientation to the equipment could be arranged for all aides as a group.

7. Discussions among the teachers using the Borg-Warner System 80 equipment and with those considering purchasing it, such as the discussion meeting held in May 1971 sponsored by the Department of Language Arts, should be continued periodically. Discussions at least twice a year would be valuable.

EVALUATION REPORT

BORG-WARNER SYSTEM 80 PROGRAM

BORG-WARNER SYSTEM 80 PROGRAM

EVALUATION REPORT

I. Introduction

Background and Rationale:

The median reading achievement score for District of Columbia elementary school children on standardized reading tests has fallen below the national norms. Since the beginning of the 1970-71 school year school administrators have committed themselves to a program, the Academic Achievement Project, designed to eliminate this reading deficiency. Individualizing instruction through the use of educational technology and programmed learning materials offers one approach to achieving this goal. An example of educational technology designed to individualize instruction and supplement primary level reading instruction is the Borg-Warner System 80. The Borg-Warner Corporation of Chicago field-tested this technology in four District of Columbia schools as well as in some Chicago schools. Then, in FY 1971, in an effort to extend the use of this technology in the District schools, the Department of Language Arts of the Division of Instruction purchased 54 Borg-Warner System 80 audio-visual machines and 270 kits of programmed reading materials from two Borg-Warner series entitled "Learning Letter Names" and "Reading Words in Context." The equipment and materials arrived in January 1971. They were then distributed to the four schools that had field-tested the technology and to 14 additional elementary schools selected on the basis of their low September 1970 standardized reading test scores.

Research into the effectiveness of programmed instruction, computer-assisted instruction and talking typewriters for teaching beginning reading has indicated that these methods do produce positive results. However, there is no evidence that they can teach reading any better than can the regular classroom teacher or tutor. Studies have also shown that teachers sometimes have a negative attitude toward such terms as "teaching machines" and "automated instruction." The Borg-Warner Corporation has prepared two reports on the effectiveness of the Borg-Warner System 80, basing them on the field tests of the equipment in the Chicago, Illinois, school system. In the first study the audio-visual machines and accompanying programmed materials were used in self-contained classrooms. 1/ In the second they were located in learning centers. 2/ Both studies showed that students using the Borg-Warner

1/ Summary Report of System 80 Field Test in Chicago Public Schools: 1968-69. Borg-Warner Educational Systems, Niles, Illinois.

2/ Summary Report of the Effect of System 80 Learning Programs in Two Chicago Public Schools: 1970. Borg-Warner Educational Systems. Niles, Illinois.

System 80 and the accompanying programs "Learning Letter Names" and "Reading Words in Context" made greater gains in their performance on certain reading tests after using the materials than did a matched group that had not been exposed to the Borg-Warner materials.

Purpose of the Study:

The purpose of this study is to examine the introduction of this technology into the schools which had had no prior contact with the system in order to determine the effectiveness of the materials with the children who used them. It is hoped that from the experiences of these schools, other schools will be able to decide whether the Borg-Warner System 80 technology could be a useful adjunct to their reading programs and to their efforts to raise the reading achievement level of children in the District of Columbia.

II. Program Description

Program Objectives:

The Department of Elementary Education purchased the Borg-Warner System 80 equipment in order to provide teachers with educational technology which would assist them in individualizing instruction. The goals toward which the Borg-Warner System 80 programmed reading materials and equipment are directed are as follows:

Major Objective: To build vocabulary and to develop beginning reading skills.

Specific Objectives:

1. To teach students to recognize the names of letters in the alphabet.

2. To teach recognition of the capital and small forms of the alphabet.

3. To provide a method for teaching and learning that is both self-motivating and enjoyable.

4. To create a desire and a love for reading on the part of the student.

5. To teach recognition of a fundamental vocabulary of approximately 200 service words and 100 high-frequency nouns in context.

    a. Words that appear frequently in most reading matter

    b. Words that appear frequently in most primary-level basal readers

6. To aid the teacher in individualizing reading instruction.

7. To aid in remedial as well as developmental reading.

8. To provide a tool that may be used in conjunction with any beginning reading program.

Scope of the Program

Two Borg-Warner System 80 audio-visual units and ten kits of sequenced programmed reading materials were placed in each of the selected elementary schools whose scores on the September 1970 standardized reading tests had been among the lowest in the District. The schools which received the equipment in January 1971 are:

J.F. Cook	Hendley	Lovejoy	Tyler
Crummell	Kenilworth	Madison	Walker-Jones
Eckington	Kingsman	Shadd	Webb
Emery	Langston		

An estimated 600 to 800 elementary students from these 14 target schools used the Borg-Warner System 80 program in the 1970-1971 school year for either developmental or remedial reading instruction. 103 students systematically selected from seven of these schools were chosen by the evaluation team as subjects of the evaluation study.

Equipment and Materials

The learning principle upon which the Borg-Warner System 80 has been developed is similar to that used in behavior modification: immediate and positive reinforcement facilitate learning; systematic repetition and review help the student retain information. From this the Borg-Warner Corporation developed diagnostic/prescriptive materials for instruction in both reading and mathematics to be used with an audio-visual unit. To date the District school system has used materials from two of the reading series only. The one, "Learning Letter Names", consists of two kits which teach upper and lower case letters. In the seven schools used in this study, these kits were used for developmental work with primary students. The other series, "Reading Words in Context", teaches a vocabulary of approximately four hundred high-frequency beginning reading words. According to the Borg-Warner Corporation the words in the 11 kits of this series correlate highly with words used in most primary basal readers. The schools given the equipment received eight of the 11 kits in this series. In the seven schools involved in this evaluation study, these materials were used primarily with intermediate students for remedial instruction. Only a few of the first grade students progressed in the four months of this study from the alphabet materials to the vocabulary materials.

Training Workshops

To acquaint the administrators and teachers of the 14 selected schools with the System 80 program and to provide them with information and experience on which to base decisions about the distribution and use of the System 80 equipment in their schools, the Department of Elementary Education sponsored two half-day workshops in December 1970. The workshop sessions were conducted by a representative of the Borg-Warner Corporation who explained the theory and the use of the Borg-Warner System 80 and its components. Attending the first half-day workshop were school principals and members of Reading Mobilization Teams. The second half-day workshop was designed specifically for those teachers who would use the audio-visual machines, either in their classrooms or in a central location.

Budget

The Department of Language Arts of the Division of Instruction bought 54 Borg-Warner System 80 audio-visual units and 270 kits of programmed reading materials with about $60,000 from regular budget funds. The approximate cost of each machine is $500 and of each kit of programmed materials $125. The 14 target schools received a total of 28 audio-visual machines and 140 kits of materials costing approximately $31,500. No additional monies were budgeted for coordination of the program or for the workshops held for teachers working with the program.

III. Evaluation Procedure

Sample

From the estimated 600 to 800 elementary pupils using the Borg-Warner System 80 in the 14 target schools from January to May, 1971, the evaluation team systematically selected 103 pupils as subjects for the evaluation study. The subjects were selected from the seven target schools which had sent teachers to the December 1970 training workshop designed to acquaint teachers using the equipment with the System 80 porgram. Every third child on the class roster of the teachers using the equipment in these seven buildings was included in the sample total of 103 students. Because the class lists of boys and girls were kept separate during the selection process, the sample consisted of nearly equal numbers of girls and boys. The seven schools from which the subjects were drawn were:

J.F. Cook
Eckington
Emery
Kenilworth
Kingsman
Tyler
Walker-Jones

Twenty pupils were eliminated from the sample because they transferred, were dropped from the program by their teachers, or the program was discontinued in their class. The final sample consisted of 83 pupils divided into two groups; 46 pupils using the System 80 to supplement developmental instruction; and 37 using it to supplement remedial instruction. Throughout this report data will be presented for each group separately.

Evaluation Plan

To assess the effectiveness of the Borg-Warner System 80 program, an evaluation team from the Departments of Research and Evaluation of the Division of Planning, Research and Evaluation examined the impact of the program on a sample population selected systematically from seven of the 14 target schools. The techniques of questionnaires, interviews, and observation were used to collect data on the subjects, their teachers, and other teachers using the program. The subjects were interviewed by the evaluation team in January, 1971, before the program began, and again in May at the end of the school year. The teachers of the sample pupils completed pre-post questionnaires on the children's reading habits and attitudes and kept a record of their progress on the Borg-Warner System 80 materials. These teachers also made comments on the pre-program workshop. All the teachers using the Borg-Warner System 80 in the 14 selected schools were asked to respond to a final evaluation questionnaire. In addition the evaluation team observed the December 1970 workshops and watched the machines being used in the schools. The following instruments were used in the data collection:

1. Pupil Questionnaire (pre-post interview)
2. Student Checklist (pre-post form completed by teacher)
3. Student Progress Record (cumulative)
4. Reading Workshop Questionnaire -- Participating Teachers
5. Teacher Questionnaire, Final Evaluation, May 1971

The data was tallied and analyzed in the Departments of Research and Evaluation of the Division of Planning, Research and Evaluation. T-tests were used to determine whether statistically significant changes had occurred during the period between January and May 1971 .

Delimitations

The evaluation study is limited to data gathered in seven of the 14 target schools, except for a final teacher questionnaire which was mailed in May to teachers in all target schools.

No attempt has been made to use the data to determine the cost-effectiveness of the Borg-Warner System 80 program. Nor can a definite cause-effect relationship be established between the use of the System 80 and any change in a subject's reading achievement.

Interpretation of the data is also limited because the amount of time and emphasis given to the System 80 program varied among the classes. In this report no consideration has been made for the time each subject spent working with the System 80.

IV. Presentation and Analysis of Data

Data on the Students in the Sample

Data on the students in the sample have been drawn from two sources: from the students themselves and from their teachers. In the discussion that follows the sample is divided into two groups according to the purpose for which the students used the Borg-Warner System 80 -- developmental instruction or remedial instruction. Each group is further subdivided into "classes" which for the purposes of this report means the children in the sample taught by the same teacher. In the developmental group the children in one class came from one self-contained classroom and usually used the equipment in their classroom. The remedial "class" is composed of children who were drawn from several self-contained classrooms and who used the Borg-Warner equipment in central locations, usually reading centers, under the direction of a single teacher. The 83 students in the final sample were distributed as follows: Developmental--7 classes, 46 pupils; Remedial -- 5 classes, 37 pupils.

Table 1 shows a profile of the subjects by grade level, sex, and Borg-Warner System 80 program.

Table 1

Evaluation Study Subjects By Grade, Sex, and Program

Grade	Number of Subjects						Grand Total
	Developmental		Remedial		Total		
	M	F	M	F	M	F	
Grade 1	17	14	0	0	17	14	31
Grade 2	6	9	2	0	8	9	17
Grade 3	0	0	4	2	4	2	6
Grade 4	0	0	11	5	11	5	16
Grade 5	0	0	6	1	6	1	7
Grade 6	0	0	4	2	4	2	6
Total	23	23	27	10	50	33	83
	46		37		83		

All elementary grade levels were represented among the 83 subjects. The Developmental group was composed entirely of primary students, while most of the remedial group was drawn from the intermediate grades.

The subjects ranged in age from six years to 13 years as is shown below:

Age	Number of Pupils	Age	Number of Pupils
6	19	10	3
7	18	11	7
8	7	12	7
9	8	13	4

(data lacking for 10 subjects)

According to information received from their teachers, all the subjects, both Developmental and Remedial, were reading at the third grade level or below when the evaluation study began in January 1971.

Table 2 on the next page shows the results of the analysis of the pre-post data from the student interviews and from the teacher questionnaires. Responses have been translated into numerical scores for statistical treatment. (For a breakdown by class see Appendix A, Tables A, B, and C.) T-tests were used to determine the significance of the difference between the pre and post mean scores of each group in each category. The results showed that the students' attitudes toward reading became significantly more positive between January and May 1971, and according to their teachers' assessments their reading knowledges and habits also became significantly more positive over the same time period.

A. Reading Attitude

To assess the students' attitudes toward reading in general, a 15-question instrument adapted from Dutton's Pupil Attitude Scale was developed by staff members of the Departments of Research and Evaluation of the Division of Planning, Research and Evaluation. (See Appendix B) Each student in the sample was asked to respond to these questions in an individual five to ten minute interview by answering "Always," "Sometimes," or "Never." A numerical value was assigned to each response -- 5, 3, or 1 depending upon whether the response was positive, neutral or negative, respectively -- and a sum total was calculated to give the subject an "attitude score." Out of a possible score of 75, the 42 Developmental subjects for whom pre-post data exists had a pre-mean score of 53.8 and a post-mean of 64.4. The t-test revealed that this result was significant at the 5 percent level of confidence. The 32 Remedial students who had a pre-mean of 58.7 and a post-mean of 62.3, also made statistically significant gains at the 5 percent level of confidence.

Table 2
Changes in Reading Attitudes, Knowledges,
and Habits of Sample Pupils,
January to May, 1971

I. Comparison of Pre and Post Means
of Developmental and Remedial Groups

Area and Group	Number In Sample	Total Possible Score	Pre Mean	Post Mean	t-score	Level of Significance
A. Reading Attitude						
1. Developmental	42	75	53.8	64.4	5.2064	5%
2. Remedial	32	75	58.7	62.3	2.4542	5%
B. Reading Knowledge						
1. Developmental	45	30	19.0	23.3	6.2430	5%
2. Remedial	35	30	15.4	25.2	11.1088	5%
C. Reading Habits						
1. Developmental	45	60	41.5	44.8	5.2064	5%
2. Remedial	35	60	31.1	36.3	2.4542	5%

II. Comparison of Developmental and Remedial Groups
On Pretest and Posttest

Area and Test	Developmental Group	Remedial Group	t-score	Level of Significance
A. Reading Attitude				
1. Pretest mean	53.8	58.7	1.718	not sig.
2. Posttest mean	64.4	62.3	1.166	not sig.
B. Reading Knowledge				
1. Pretest mean	19.0	15.4	2.952	5%
2. Posttest mean	23.3	25.2	1.243	not sig.
C. Reading Habits				
1. Pretest mean	41.5	31.1	5.065	5%
2. Posttest mean	44.8	36.3	2.394	5%

It is interesting that on the basis of the interview results the remedial group had a better attitude toward reading when the study began than did the developmental group, the mean of the remedial group being almost 5 points higher. Yet in May the mean attitude score of the remedial group was two points lower than the developmental group mean. A t-test was computed on the pre and post means to determine whether the difference between the pre-means of the two groups and the post-means of the two groups was statistically significant. In both cases, however, the difference was not statistically significant.

We can conclude from the results of the pre-post student interviews that the students who were using the Borg-Warner System 80 machines and programmed reading materials between January and May 1971 improved their attitudes toward reading significantly over the four month period. In addition, according to the students' own statements, there was no significant difference in the attitudes towards reading between the students using the materials to supplement the initial development of reading skills and those using it for remedial instruction. The two groups of students had similar attitudes toward reading at the beginning of the study, both showed statistically significant improvement in attitude, and both displayed similar attitudes at the end of the study.

B. Reading Knowledge

The teachers of the pupils in the sample assessed the children's reading knowledge and habits by completing a pre-post instrument designed by the staff of the Departments of Research and Evaluation of the Division of Planning, Research and Evaluation. (See Appendix C) They were asked to rate the children on six dimensions of reading knowledge which the Borg-Warner Corporation claimed could be improved by the use of the System 80 materials. The teachers rated the students on a 5-point scale ranging from "very poor" valued 1 to "very good" valued 5. The sum of the ratings for an individual child was calculated to give a "knowledge score" out of a possible 30 points. The 45 pupils in the Developmental group for whom pre and post data was collected had a pre mean of 19.0 and a post mean of 23.3. The 35 pupils in the Remedial group improved their mean "knowledge score" from 15.4 to 25.2. T-scores revealed that the increases were statistically significant at the 5 percent level of confidence.

The pre-mean score of the Remedial group was 3.6 points lower than that of the Developmental group. Yet the post-mean of the Remedial group was 1.9 points higher than that of the Developmental group. While the mean difference between the pre and post scores of the Developmental subjects was 4.1 points, the mean difference of the Remedial subjects was 8.1 points or almost twice that of the Developmental group. A t-test

applied to the pre-scores of the two groups revealed that there was a statistically significant difference between the Developmental and Remedial groups in their reading knowledge at the beginning of the study, the knowledge of the remedial subjects being significantly lower than that of the Developmental subjects. A t-test applied to the post-scores showed that there was no statistical difference between the two groups. While each group had shown a statistically significant improvement in their reading knowledge by the end of the study, the Remedial group had improved enough to close the statistically significant gap in reading knowledge that had been evident at the beginning of the study.

We can conclude from the knowledge ratings made by the teachers that the pupils using the Borg-Warner System 80 machines and programmed reading materials made a statistically significant gain in their reading knowledge between January and May 1971. We can also conclude that the pupils in the remedial sample improved their knowledge of reading significantly more than did the pupils in the Developmental sample. While the Borg-Warner System 80 was a factor in the reading programs of all these students during this time, the results suggest that the equipment played a more important role in improving the reading knowledge of the Remedial students than of the Developmental students, although it must be remembered that both groups improved significantly during the time period of this study.

C. Reading Habits

The teachers of the pupils in the sample made a pre-post rating of the children's reading habits and attitudes. Again they used a 5-point scale ranging from "very poor" valued at "1" to "very good" valued at "5." A total possible score on the 12 dimensions rated by the teachers was 60. (See Appendix C) The 45 Developmental subjects for whom pre-post data exists improved their reading habits, according to their teachers, from a pre-mean of 41.5 to a post-mean of 44.8, with a mean difference of 8.5 points. The Remedial subjects improved from a pre-mean of 31.1 to a post-mean of 36.3, with a mean difference of 3.5 points. T-scores computed to determine whether the gains of either group were significant revealed that in both cases the gains were significant at the 5 percent level of confidence.

The pre-mean scores of the two groups differed by 10.5 points and the post-mean by 8.5 points. A t-test applied to the means showed there was a statistically significant difference at the 5 percent level of confidence between the Developmental and Remedial sample groups in their reading habits both at the beginning and at the end of this study. While

their teachers gave the Developmental students an overall rating of "Fair" at the beginning of the study and "Good" at the end, the Remedial students rated a low "Fair" initially and at the conclusion of the study were still rated "Fair," Nevertheless, each group made significant progress during the four months of this study.

We can conclude that according to the teachers, the students, both Developmental and Remedial, using the System 80 materials made statistically significant gains in their reading habits between January and May 1971. The mean score of the Remedial group was significantly lower than that of the Developmental group, both at the beginning and at the conclusion of the study. Therefore, the techniques used with the Remedial group had no greater effect on their reading habits than the techniques used with the Developmental group had with them.

D. Student Opinions about Borg-Warner System 80

At the conclusion of the post-interview the students in the sample were asked specifically what they thought about the Borg-Warner program and why they felt that way. Thirty-four of the Developmental subjects and 23 of the Remedial subjects were asked these questions. The students' responses are displayed in Tables3 and 4 on the next page.

According to Table 3, almost all the subjects, both Developmental and Remedial, liked using the System 80 and thought it had helped them in their reading development. The Remedial subjects were unanimous in saying that they liked using the machine and that it helped them learn new words. This supports a previous conclusion that the Remedial subjects made greater progress in their reading knowledge during the time period of the study than did the Developmental subjects. The Remedial subjects were not as positive toward the other two questions asked as were the Developmental subjects. That 22 percent made no response to the question about learning the letters of the alphabet is because they probably were not using the "Learning Letter Names" series. It is interesting that while 100 percent of the Remedial subjects liked using the Borg-Warner machine, 9 percent did not like reading any better than previously without the machine. Conversely, however, that 87 percent of the Remedial group did like reading better with the aid of the System 80 seems significant in the context of the other results.

Table 4 shows that the most frequently mentioned reasons for liking the System 80 were the same for both the Developmental group and the Remedial group: "It helps me learn letters and words," said 44 percent of the Developmental subjects and 25 percent of the Remedial subjects; "It's got pictures; I can see the letters and words," answered 26 percent of the Developmental subjects and 20 percent of the Remedial subjects.

Table 3
Sample Pupils' Opinions About
Using the Borg-Warner System 80 Program,
by Group

Question	Developmental Pupils N=34				Remedial Pupils N=23			
	Yes	Sometimes	No	No Response	Yes	Sometimes	No	No Response
1. Do you like using the Borg-Warner Machine?	97%	3%	---	---	100%	---	---	---
2. Does it help you learn the letters of the alphabet?	94%	6%	---	---	74%	4%	---	22%
3. Does it help you learn new words?	94%	---	---	6%	100%	---	---	---
4. Do you like reading better when you use the Borg-Warner machine?	97%	---	3%	---	87%	4%	9%	---

Table 4
Reasons Given By Sample Pupils
for Liking the Borg-Warner
System 80 Program

Reasons	Developmental		Remedial	
	No.	%	No.	%
1. It helps me learn new letters and words.	12	44	5	25
2. It's got pictures; I can see the letters and words.	7	26	4	20
3. It can talk.	3	11	2	10
4. It helps me read.	3	11	2	10
5. It helps me learn spelling.	0	---	2	10
6. It makes learning new words fun.	0	---	2	10
7. I like pushing the buttons.	1	4	1	5
8. I can see my mistakes on the test tabs.	0	---	1	5
9. I get out of regular class.	0	---	1	5
10. I don't have to turn pages.	1	4	0	---
Total	27	100	20	100

We can conclude that the students in the sample enjoyed using the Borg-Warner equipment and thought they were learning from it. From the reasonsgiven for liking it, we can further conclude that it was the unique aspects of the program -- the visual and audio aspects -- that attracted the children most. We also saw that the subjects in the Remedial group were unanimously in favor of the Borg-Warner approach.

E. Student Progress on Borg-Warner Programmed Materials

To determine whether the Borg-Warner System 80 equipment and programmed materials actually taught the words and letters used in the programs, data on the students' performances on the pre and post tests for each Borg-Warner kit were collected. The hypothesis was that if the children made a significantly fewer number of errors on the posttest, then they had learned the material presented. The evaluation team asked the teachers of the sample pupils to record on a form provided (see Appendix D) the number of words or letters on which the pupils made errors on both the pre and post tests of each kit that the child worked with. The evaluation team chose this method to evaluate student progress for two main reasons: (1) Standardized tests based on the programmed materials were not available; (2) Non-related reading materials could not measure the extent to which a child's progress was due to the System 80 approach. The teachers were asked to collect the data on the grounds that the procedure would take a minimal amount of their time; in any case they had to examine the test tab on the pretest to prescribe the lessons needed by the individual student and on the posttest to determine whether the child should progress to the next level. A number of problems developed with this procedure which have frustrated the analysis of student progress.

1. The test tabs which were to be used with the pre and post tests of the various kits of materials were not available when the children began using the System 80. After the test tabs did arrive, they were used up before the school year ended. This meant that some teachers had to sit with the children while they took the pre and post tests to record the errors for the evaluation team. In some cases no time existed for this.

2. The test tabs were made of very flimsy paper and frequently, according to the teachers, tore when the machine punched holes in them to indicate mistakes; thus mistakes were unidentifiable and could not be counted accurately.

3. Although the recording procedure was explained carefully to the teachers and the instructions were printed on the Student Progress Record which they were given by the evaluation team, some of the teachers counted total number of mistakes instead of words on which mistakes were made. Such data had to be omitted.

4. The results returned to the evaluation team gave no indication of the number of times a child repeated the lessons before the posttest result was recorded. While this is not in itself a problem, the fact remains that poor posttest results might not have occurred if teachers had recycled the student through the lessons.

Some pre-post progress data were, however, available for analysis from five of the seven Developmental classes and from three of the five Remedial classes, but not from each sample pupil in these classes. Fifty of the 83 pupils in the sample completed at least one set of programmed materials through the post test. Data from 40 of these pupils were grouped and treated statistically. Most of the Developmental subjects worked only with the two alphabet kits in the "Learning Letter Names" series; 21 did not get as far as the posttest, that is through 17 lessons in the 4 months of the study. Matched data for Kits A/B of the alphabet series exists for 18 of the 46 Developmental subjects. Most of the Remedial students worked in the "Reading Words in Context" series. Few subjects progressed beyond the first four (second grade level) of the eight kits during the four months of this study. Matched data on the pre-post tests for Kits A, B, C, and D exist for 13, 11, 14 and 8 of the 37 Remedial subjects, respectively, or a total of 22 students (several completed more than one kit). T-tests were used for the pre-post data for each kit to determine whether the results were statistically significant. The mean scores, the t-scores and the level of significance of the t-test results are shown in Table 5 below.

Table 5
Comparison of Pupils' Mean Errors on
Borg-Warner System 80 Pre and Post Tests

Kit	Number In Sample	Total Possible Errors	Pre Mean (Error)	Post Mean (Errors)	Mean Difference (Errors)	t-score	Level of Significance
Developmental Group:							
A/B	18	52	19.4	9.7	9.7	4.04	5%
Remedial Group:							
A	13	38	12.2	4.0	8.0	7.00	5%
B	11	36	7.9	2.9	5.0	6.78	5%
C	14	36	6.2	3.0	3.2	6.38	5%
D	8	36	5.4	3.3	2.1	2.32	-

Table 5 shows that the 18 developmental subjects reduced their mean error on Kits A/B of the alphabet series from 19.4 to 9.7. The t-test on the mean showed that this result was statistically significant at the 5%

level of confidence, indicating that the change did not occur by chance. We can conclude that the System 80 was successful in reducing significantly the subjects' errors in recognition and identification of the upper and lower case letters of the alphabet. However, a question arises in light of these results: What level of achievement should be reached on a post-test before a child proceeds to the next kit in the series? Is a mean of 9.7 errors on the posttest an acceptable performance level for a group of 18 children? This mean indicates that after completing the Borg-Warner alphabet program consisting of thirteen teaching lessons and four review lessons, the group as a whole could not identify 19 percent of the upper and lower case letters. Borg-Warner Corporation literature recommends that children repeat the material missed on the posttest until no errors are made. Several teachers told the evaluation team that their students had repeated the work a number of times before they achieved an "acceptable" posttest score. Perhaps some of the pupils did not repeat the material a sufficient number of times.

It should be noted here that few of the Developmental subjects continued to use the machine after they completed the alphabet series. The teachers indicated to the evaluation team that the "Reading Words in Context" series was on the whole too difficult for the first grade children using the program. They thought there was too great a jump between the alphabet series and the words in context series. Since the time when the District of Columbia school system ordered its Borg-Warner materials, the Borg-Warner Corporation has developed a transition set of phonics materials, "Learning Letter Sounds."

Table 5 also shows that the Remedial subjects working in the "Reading Words in Context" series showed statistically significant improvement on Kits A, B, and C, but not on Kit D. First, it should be noted that these results are based on only a small number, not more than 35 percent, of the pupils in the remedial sample. Second, it is questionable whether these pupils can still be considered a true sample on the grounds that only the children who completed a kit in the series were included in this data. It represents the better of the sample pupils. From the data that is here, however, a few trends are apparent. The posttest means for each of the kits indicate that the pupils completed the kit missing only 10 percent or fewer of the words presented, a result which seems more acceptable than that of the developmental group but which does not represent 100 percent mastery of the material. On the other hand, the pupils missed fewer than one-third of the words presented in each kit on each pre-test. Do the children who use the equipment derive benefits from using the machine other than an improvement in the number of words or letters they can recognize and read in context?

The results of the Remedial group on these four kits in the "Reading Words in Context" series suggest a hypothesis that would indicate there are valuable side benefits to the use of the Borg-Warner System 80. While the level of difficulty of the vocabulary increased from Kit A

through Kit D, the pre-mean error level of the Remedial students for whom pre-post scores exist decreased on each kit from Kit A through Kit D. Could it be that the longer the Remedial student works with the Borg-Warner System 80 the fewer errors he makes at initial contact with the material? If so, this suggests that he is developing the skills that are needed to respond effectively to the machine: listening skills, visual discrimination, the ability to follow directions, and so on. If this could be documented, and it cannot from this study, then this aspect of the Borg-Warner System 80 should be considered as important as whether or not the pupil learns all the words in the programmed material. Mastering these skills could possibly give the child tremendous self-confidence and motivation in other learning situations.

In summary, the pupils in both the Developmental and Remedial sample groups made statistically significant improvement from the pre to post tests on the programmed materials of the Borg-Warner System 80 in Kits A/B of the alphabet series and Kits A, B, and C of the words in context series. No statistically significant gains were made in Kit D of the words series, basically because the initial number of errors was so low (5.4 out of 36) and the number in the sample was so low (8 pupils). While the Developmental pupils had a mean error rate of 19 percent on the posttest, the Remedial group's posttest error rate was ten percent or less. Although no group demonstrated 100 percent mastery over the material in any one kit, the mean error of the Remedial students decreased steadily as the kits increased in difficulty. The data suggests that the students were making gains in the skills needed to operate the equipment, such as listening skills and visual discrimination, as well as gains in word recognition.

F. Reading Level in Grade Equivalent

On the pre-post teacher questionnaire, the teachers noted their assessment of the subject's reading level in grade equivalent. Table 6 below displays this information.

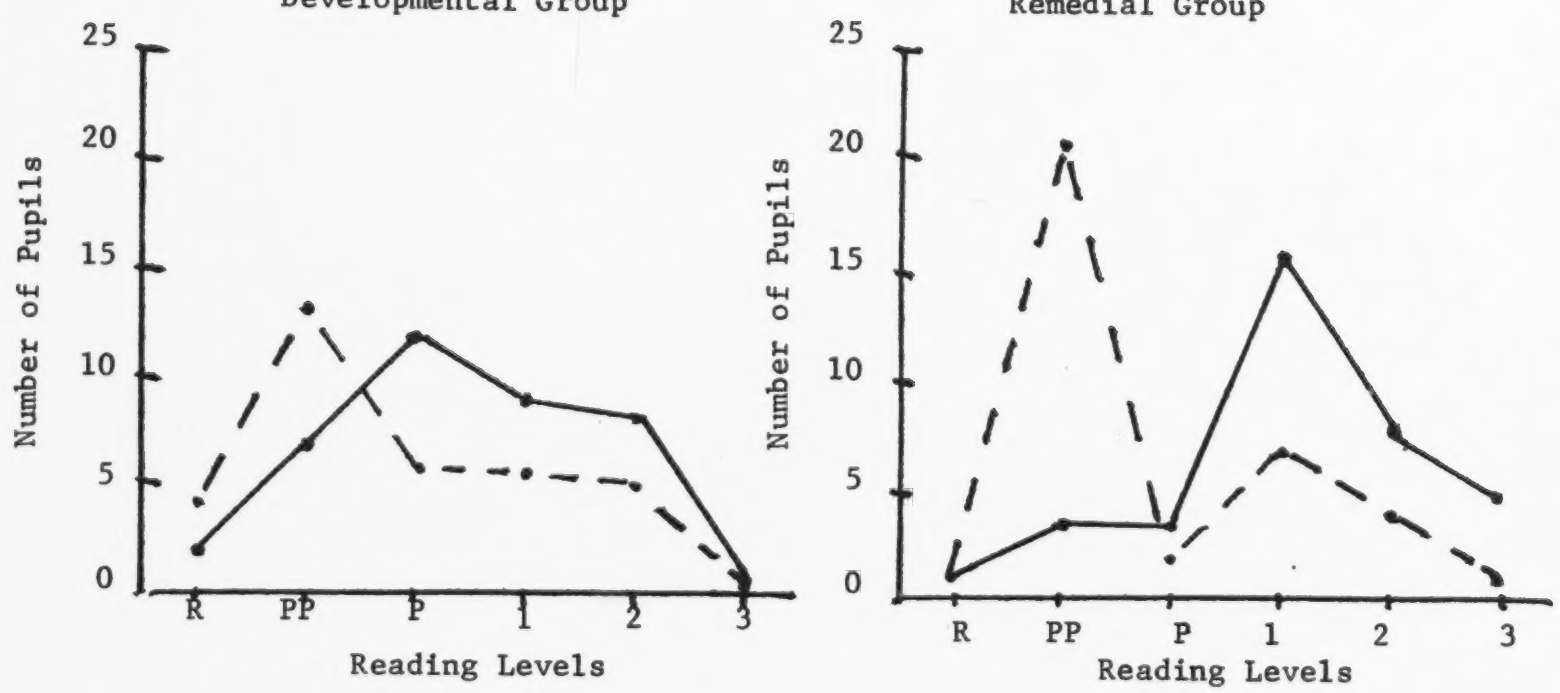
Table 6
Evaluation Study Subjects
By Reading Levels,
Pre and Post

Reading Level	PRE			POST		
	Developmental	Remedial	Total	Developmental	Remedial	Total
Readiness	4	1	5	2	1	3
Preprimer	13	21	34	7	3	10
Primer	6	2	8	12	3	15
First	6	7	13	9	16	25
Second	5	4	9	8	8	16
Third	0	1	1	0	5	5
No Data	12	1	13	8	1	9
Total	46	37	83	46	37	83

All subjects, both primary and intermediate, were reading at the third grade level or below. The graphic presentation of this same data in Figure 1 on the next page reveals that there was general improvement in the reading level in grade equivalents of the subjects according to their teachers' assessments. The median reading level of each group in January -- the Developmental group consisting predominately of first graders, and the Remedial group consisting largely of intermediate students -- was at the pre-primer level. By May the median reading level of the Developmental group had shifted to the primer level. During the same time period, the median reading level for the Remedial group had risen to the first grade level. That intermediate students receiving Remedial reading instruction should show such progress in four months seems startling. The motivational aspect of the Borg-Warner audio-visual approach to reading may have been a key factor in this progress.

Figure 1

Pre-Post Reading Levels of Subjects,
By Group



Data on the System 80 Program as a Whole

Data on the System 80 program as a whole was gathered from those teachers using the equipment and programmed materials in their reading programs at the 14 target schools. The teachers of the pupils in the sample completed a questionnaire concerning their expectations for the program following the half-day training workshop in December, 1970. All the teachers using the Borg-Warner System 80 in the 14 selected schools were sent a final evaluation questionnaire to complete and return to the Departments of Research and Evaluation of the Division of Planning, Research and Evaluation.

A. Teachers' Expectations for the Borg-Warner System 80 Program

At the conclusion of the half-day training workshop held in December, 1970, for teachers scheduled to use the Borg-Warner System 80 in their classrooms or special reading program, staff members from the Departments of Research and Evaluation of the Division of Research and Evaluation asked participating teachers to respond to a number of questions. (See Appendix E) Seven of the 14 schools selected to receive the equipment sent representatives to the workshop. Six of the teachers present completed the form and returned it to the evaluation team members. Table 7 shows the teachers' responses to ten questions about the Borg-Warner program.

Table 7
Training Workshop Participants' Expectations
for the Borg-Warner System 80
Program

Questions	Yes		No		Undecided	
	No.	%	No.	%	No.	%
1. Do you think the Borg-Warner system will be effective in teaching alphabet names?	5	83%	0	---	1	17%
2. Do you think the Borg-Warner system will be effective in teaching recognition of words in context?	4	67%	0	---	2	33%
3. Do you think the Borg-Warner system will be effective in teaching high frequency vocabulary words?	4	67%	0	---	2	33%
4. Do you think the Borg-Warner system will aid in individualizing instruction?	6	100%	0	---	0	---
5. Do you think the Borg-Warner system will be self-motivating?	6	100%	0	---	0	---
6. Do you think your pupils will enjoy working with the Borg-Warner system?	6	100%	0	---	0	---
7. Do you think the Borg-Warner system will aid in the development of positive reading attitudes?	5	83%	0	---	1	17%
8. Do you think the Borg-Warner system will be a useful tool in a developmental reading program?	4	67%	0	---	2	33%
9. Do you think the Borg-Warner system will be a useful tool in remedial instruction?	6	100%	0	---	0	---
10. Do you think you have enough information to implement this system?	6	100%	0	---	0	---

According to Table 7 the teachers were unanimous in thinking the Borg-Warner System 80 would help individualize instruction, be self-motivating and enjoyable for the students, and be a useful tool in remedial instruction. They also thought they had enough information to implement the program. One third of the respondents were undecided about how effective the system would be in teaching word recognition and high frequency vocabulary, and they were not convinced about its usefulness as a tool in a developmental program. However, none of the respondents were negative toward the Borg-Warner System 80.

The teachers were also asked to comment on their knowledge, as a result of the training workshop, of various phases of the implementation of the program. These results are displayed in Table 8.

Table 8
The Extent to Which Information About the
Borg-Warner System 80 Was Disseminated
at the Training Workshop

Areas of Concern	To A Great Extent		To Some Extent		Not At All	
	No.	%	No.	%	No.	%
1. Programming children in the use of materials.	6	100%	0	---	0	---
2. Determining the amount of time each pupil should spend in the program daily.	1	17%	4	67%	1	17%
3. Determining which children should use the Borg-Warner system.	4	67%	2	33%	0	---
4. Evaluating pupil progress	4	67%	1	17%	1	17%
5. Recording pupil progress	4	67%	1	17%	1	17%

According to Table 8 the respondents were most sure about the process of programming the children in the use of the materials. They were least sure of the amount of time each pupil should spend in the program daily. In responding to two other questions following the workshop, 67 percent of the teachers indicated they had a "highly favorable" attitude toward the Borg-Warner System 80, while the remaining 17 percent of the respondents, or 83 percent, characterized their "present understanding" of the system as "good".

We can conclude that the teachers had a favorable attitude toward the Borg-Warner System 80 before they began using it with their pupils. Also they thought they had sufficient information to implement the system and integrate it into their reading programs. This information contradicts literature which states that often teachers have unfavorable attitudes toward "teaching machines" and "automated teaching." While it is not certain that the teachers who did not attend the training workshop shared a similar attitude, it is certain that this attitude prevailed among the teachers of the students in the evaluation sample. The attitude of the teacher is a crucial element in the introduction of new processes and procedures to children. In this instance, the program appears to have had practically full support from almost all the teachers who responded to the initial teacher questionnaire. Their expectations for the program were high and they were prepared to support the implementation.

B. Teachers' Final Evaluation of the Borg-Warner System 80 Program

Final evaluation questionnaires developed by the evaluation team were sent to 29 teachers in the 14 target schools whom the Department of Language Arts had listed as using the Borg-Warner System 80 and programmed materials. (See Appendix F) A total of 22 questionnaires were completed and returned to the Division of Planning, Research and Evaluation -- 11 from teachers working with the pupils in the sample and 11 from teachers at the other seven schools involved in the program. Sixteen of these respondents were regular classroom teachers, 4 were reading specialists, and 2 were MIND teachers. Generally, the respondents were experienced teachers, only 5 having fewer than 5 years of teaching experience and 3 having more than 20 years' experience as is shown below:

Years of Teaching	Number of Respondents	Percent of Respondents
1 - 5	5	23
6 - 10	8	36
11 - 15	5	23
more than 15	4	18
Total	22	100

Nine of the responding teachers stated they were using the Borg-Warner System 80 in developmental reading instruction, eight were using it in remedial reading instruction, and six made no response. (Note: Two indicated they were using the equipment for both developmental and remedial instruction.) Thirteen of the responding teachers indicated they were teaching first grade and three second grade, accounting for

all 16 classroom teachers. The remaining six respondents -- reading specialists and MIND teachers -- dealt with a variety of grade levels.

In summary, the comments about the experiences with the System 80 in 14 target schools in the District of Columbia Public Schools between January and May 1971 come from experienced teachers, of whom 73 percent are regular classroom teachers, with 59 percent teaching on the first grade level. Even though there were only six non-classroom teachers among the respondents, eight respondents said they were using the equipment for remedial instruction. This suggests that a few of the regular classroom teachers concentrated their use of the materials with their slower students.

This report has stated previously that there were no uniform standards about the number of times per week a student should use the equipment to obtain maximum benefit from it or about the amount of time the pupil should spend with the materials at each sitting. To get a general idea about these two aspects of the program, the teachers were asked in the final evaluation to estimate the average number of times per week their students used the System 80 equipment and to estimate also the average amount of time spent at the machine each time by the pupils. The results are displayed in Table 9.

Table 9
Pupil Use of Borg-Warner System 80
Audio-Visual Units, According to Participating Teachers

Item	No. of Respondents	% of Respondents
A. Average number of turns per week per student		
1. 10 or more	1	5
2. 7 - 9	2	9
3. 4 - 6	10	45
4. 1 - 3	9	41
B. Average number of minutes on the machine per child		
1. 25 or more	3	14
2. 20 - 24	3	14
3. 15 - 19	7	31
4. 10 - 14	8	36
5. 5 - 9	1	5
6. 1 - 4	0	---

According to the data in Table 9, ten of the responding teachers, or 45 percent, estimated their pupils used the Borg-Warner equipment daily, that is 4 to 6 times a week. It is possible that in these ten classrooms the equipment was being used continuously if all the children were using it for about 15 minutes a turn. The results in Part B of Table 9 show that 15 minutes per turn was the average in 15 classrooms. But the data suggests that the equipment may not have been used continuously or to capacity in all cases; it indicates that either fewer students were using it for longer periods of time or the equipment was idle for parts of the day. Indeed in conversations with teachers using the Borg-Warner System 80, the evaluation team found this to be the case. Some teachers complained that the noise of the response buttons disturbed the rest of the class so they scheduled children at certain times of the day only. Others thought they could not maintain their regular teaching routine with children tuning out for short periods of time to use the equipment. Still others thought the process of administering the program demanded more of their time than was available except at certain times of the day. To the evaluation team it seemed as if the machines placed in central locations, usually the school's reading center, were used more consistently throughout each day than were those located in self-contained classrooms.

Asked whether they had received the support they needed from the central administration office, 64 percent of the responding teachers answered "Yes" and 31 percent made no response. Asked the same question about their building, 82 percent answered "Yes" and 13 percent made no response. A few comments were made along with the responses to these questions. Respondents suggested that the central office could offer more help by facilitating repairs of the equipment, while they thought the schools could help more by recruiting parents to assist with the program and by reallocating the equipment to concentrate on supplementing remedial rather than developmental reading instruction.

Asked about the durability of the equipment, 95 percent of the respondents indicated it had been very durable. One made no response. Ten of the 22 respondents stated that they had used aides to assist them in the administration of the Borg-Warner System 80 program. Parents, paraprofessionals, other pupils, high school students, and student teachers were among those cited by the respondents as assistants. Of those teachers who had not had the services of an aide, 79 percent thought the program could be improved with the services of an aide.

The teachers were asked to rate the extent to which the Borg-Warner system was able to accomplish its proposed objectives. They were to use the following scale:

Scale	Totally	To a Great Extent	To Some Degree	Not Quite	Not At All
Value	5	4	3	2	1
Range	5 - 4.5	4.4 - 3.5	3.4 - 2.5	2.4-1.5	1.4 - 1.0

To analyze the responses an item mean was computed using the numerical value shown below the scale. The item mean was interpreted according to the range indicated beneath the value. The results of the rating by the teachers of the sample pupils and the teachers from the other selected schools are shown separately in Table 10 on the next page..

Table 10
Teachers' Appraisal of the Extent to Which
the Borg-Warner System 80 Meets It's Objectives
(5-point scale)

Objectives	Teachers of Sample N=11		Other Teachers N=11	
	Item Mean	Extent Index	Item Mean	Extent Index
1. To teach students to recognize the name of letters in the alphabet.	3.9	Great Extent	3.9	Great Extent
2. To teach recognition of the capital and small forms of the letters in the alphabet.	4.1	Great Extent	3.9	Great Extent
3. To provide a method for teaching and learning that is both self-motivating and enjoyable.	4.2	Great Extent	4.2	Great Extent
4. To create a desire and a love for reading on the part of the student.	3.6	Great Extent	3.6	Great Extent
5. To teach recognition of a fundamental vocabulary of approximately 200 service words and 100 high-frequency nouns in context.				
a. Words that appear frequently in most reading matter	3.8	Great Extent	3.4	Some Extent
b. Words that appear frequently in most primary-level basal readers	3.9	Great Extent	3.7	Great Extent
6. To aid the teacher in individualizing reading instruction.	3.8	Great Extent	3.8	Great Extent
7. To aid in remedial as well as developmental reading.	3.7	Great Extent	3.8	Great Extent
8. To provide a tool that may be used in conjunction with any beginning reading program.	4.0	Great Extent	4.1	Great Extent

The most notable aspect of the results in Table 10 is that the teachers of the sample pupils and the other teachers using the Borg-Warner equipment gave practically identical ratings to each objective. This factor contributes to the reliability of these results especially when it is remembered that these responding teachers were scattered among 14 schools with no more than three working in any one school. Furthermore, they had not been together at the same initial training workshop in December, and met together only once during the course of the four months of the study. All the final evaluation forms were returned directly to the research team by hand or to the Departments of Research and Evaluation through the mail.

According to the teachers' ratings, the objective accomplished to the greatest extent by the Borg-Warner system is "To provide a method for teaching and learning that is both self-motivating and enjoyable." This certainly supports the children's own contentions that they enjoyed working with the Borg-Warner machine (see Table 3, page 14). Of all the objectives, only one received a rating of less than "to a great extent." The teachers who were not working with the sample pupils thought the Borg-Warner system taught only "to some extent" the recognition of "words that appear frequently in most reading matter." However, the aggregate mean of this item for all the responding teachers was 3.6 or "to a great extent."

Teachers were asked on the final evaluation form to rate various operational aspects of the Borg-Warner program according to the following scale:

Scale	Excellent	Good	Fair	Poor
Value	4	3	2	1
Range	4.0 - 3.5	3.4 - 2.5	2.4 - 1.5	1.4 - 0

An item mean was computed using the numerical value shown below the scale, and it was interpreted according to the range indicated beneath the value. The results are shown in Table 11 on the next page.

Table 11
Teachers' Ratings of Operational Aspects of the Borg-Warner Program

Aspects of the Program	Teachers of Sample Students N=11		Other Teachers N=11	
	Item Mean	Rating Index	Item Mean	Rating Index
a. The machine as an easy device to operate	3.6	Excellent	3.7	Excellent
b. Student retention of what is taught by the machine	3.0	Good	2.9	Good
c. The effectiveness of the machine for:				
1) girls	3.4	Good	3.5	Excellent
2) boys	3.2	Good	3.2	Good
3) 6 to 7 year olds	2.9	Good	3.1	Good
4) 8 to 9 year olds	3.3	Good	3.6	Excellent
5) 10 to 11 year olds	3.5	Excellent	4.0	Excellent
6) 12 to 13 year olds	3.3	Good	4.0	Excellent
7) developmental reading	3.1	Good	3.0	Good
8) remedial reading	2.8	Good	3.5	Excellent
d. The machine as an aid to reducing truancy	2.0	Fair	3.0	Good
e. The machine as a motivator in creating good reading habits	2.8	Good	3.0	Good

The responding teachers rated each operational aspect of the program either "excellent" or "good" with the exception of one. The teachers who did not work with the sample pupils rated more aspects "excellent" than did the teachers of the sample pupils. Both groups agreed, however, that two aspects of the program were "excellent": 1) the machine was an easy device to operate; and 2) the machine was most effective with 10 to 11 year olds. The other aspects rated "excellent" by the teachers not working with the sample pupils support the general direction of the results of other aspects of this evaluation. They thought the machine was "excellent" for

use with girls 12 to 13 years old, and for remedial reading. While the teachers of the sample pupils rated the program only "fair" in reducing truancy by the teachers of the sample pupils, some of these teachers reported to the evaluation team that children appeared in school for their System 80 lesson when they were absent from their other lessons. The evidence does not support, however, the reduction of truancy as a generalized result of the use of the Borg-Warner System 80.

In the last sections of the final evaluation the teachers were asked to list the strengths and weaknesses of the Borg-Warner program and then to make comments on it. Table 12 displays the strengths cited by the respondents.

Table 12
Specific Strengths of the Borg-Warner System 80, According to Participating Teachers

Specific Strengths	All Responding Teachers N=22	
	No.	%
1. Motivation impact	6	27
2. Individualizes instruction	5	23
3. Develops self-confidence, independent work habits	5	23
4. Immediate feedback; reinforcement	3	14
5. Increases attention span	2	9
6. Improves comprehension	2	9
7. Strengthens auditory skills	1	5
8. Improves silent reading	1	5
9. Excellent with visual learners	1	5
10. Repetition of missed items	1	5
11. Aided promotion of behavior modification	1	5
12. No response	5	23

The strength cited by the largest number of respondents was the motivation impact of the Borg-Warner System 80. More than 80 percent of the respondents cited either this strength, or the fact that the Borg-Warner system individualizes instruction and develops self-confidence and independent work habits.

Table 13 below displays the weaknesses cited by the respondents.

Table 13
Specific Weaknesses of the Borg-Warner System 80,
According to Participating Teachers

Specific Weaknesses	All Responding Teachers N=22	
	No.	%
1. Test tabs: cause buttons to stick; time consuming	2	9
2. Slow servicing procedure	2	9
3. Too many words in Kit A of word series	1	5
4. Too noisy for classroom	1	5
5. Ineffective with children of small retentive power	1	5
6. Earphones too heavy, tight	1	5
7. Children's interest absorbed by button-pushing	1	5
8. Record-keeping by children	1	5
9. Use of word "find" in instruction is confusing	1	5
10. Need appropriate stand for machine	1	5
11. No response	9	41

The 22 respondents cited a total of only 10 weaknesses; 41 percent cited no weaknesses. Each of the weaknesses cited was mentioned by only two or fewer of the respondents. It would therefore be presumptuous to

submit that any conclusive weaknesses were among those listed in Table 13. However, the evaluation team thinks that some of the weaknesses mentioned need further discussion. Some, such as the noisiness of the machines (because of the button-pressing) and the inefficiency of the test tab process, could perhaps be important enough that the Borg-Warner Corporation would consider modifying the equipment. As is so often the case with the responses to openended questions, they provide a base for further study rather than conclusive evidence to support a point of view.

Table 14 below lists comments made by responding teachers about the Borg-Warner System 80 program.

Table 14
Comments on the Borg-Warner System 80
From Participating Teachers

Comments	All Responding Teachers N=22	
	No.	%
1. Need other subject matter kits, especially programmed phonics materials	5	23
2. Need aides	4	18
3. Need more machines per building	3	14
4. Include pictures with alphabet kits	2	9
5. More training needed		
a. for teachers to familiarize them with content of programmed materials	1	5
b. in test tab use	1	5
c. for parent volunteers, tutors, and regular teacher aides	1	5
6. Use only for remedial work	1	5
7. Too difficult to use in regular classroom	1	5
8. Use wall chart instead of student record book	1	5
9. Continue use of Student Progress Record	1	5
10. Have small buzz sessions at final workshop for teachers	1	5
11. No comment	7	32

As in the previous table, not all of the teachers registered comments. Further, fewer than 25 percent of the respondents made the same comments. Thus, the results have more merit as a base for further discussion than as conclusive evidence. However, it should be noted that the most frequently mentioned comment, that programmed phonics materials were needed, has been mentioned as a need several times in this report. One comment that reflects what the evaluation team thinks is a more widespread reaction is the suggestion to have pictures included with the alphabet kits. Several teachers mentioned this to the evaluators.

In summary, the teachers working with the Borg-Warner system from January through May, 1971, in 14 selected schools thought the Borg-Warner system achieved "to a great extent" the goals set for it. They were most pleased with it as a self-motivating and enjoyable teaching method and as a tool to be used in conjunction with any beginning reading program. They thought it was very effective in teaching the recognition of the capital and small forms of the letters in the alphabet. They thought it was an excellent way to individualize instruction and thought it helped develop self-confidence in the children. It is fair to assume that the response of the teachers implies satisfaction with the system and its contribution to their reading programs. However, the responding teachers thought that having aides to assist in the program would improve it considerably. They also felt a need for programmed phonics materials to bridge the gap between the alphabet and words in context series of materials.

We can conclude that the teachers using the Borg-Warner System 80 equipment either in their classrooms or in reading centers between January and May, 1971, had high expectations for the program and that their experience with the program gave them no reason to lower these expectations.

V. Summary and Conclusions

In January 1971, the Department of Elementary Education of the Division of Instruction placed two Borg-Warner System 80 audio-visual units and ten kits of programmed reading materials in each of 14 selected elementary schools. An estimated 600 to 800 pupils were able to use the technology to supplement either their developmental or remedial reading instruction. To evaluate this program, an evaluation team from the Departments of Research and Evaluation, Division of Planning, Research and Evaluation collected data from several sources on a systematic sample of 103 pupils drawn from seven of the 14 target schools. The children responded to questions about their attitude toward reading in a pre-post interview, their teachers completed questionnaires about the

pupils' reading knowledges and habits, their teachers kept progress records of the pupils' performances on the Borg-Warner System 80 pre-post tests for each kit of materials. All teachers using the equipment completed a questionnaire on the total program. The data base for this evaluation report included: 1) pre-post matched data from student interviews and teacher questionnaires on 83 elementary students using the Borg-Warner System 80; 2) Borg-Warner System 80 pre-test and post-test scores for 40 sample pupils; 3) reaction from 6 teachers to pre-program workshop; 4) responses from 22 teachers to Final Evaluation Questionnaire.

T-tests were used with the pre-post matched data collected from the student interviews and the forms completed by the teachers of the sample pupils. (See Table 4) Both groups of pupils -- 46 Developmental students and 37 Remedial students -- made statistically significant gains in their reading attitudes, knowledges, and habits during the time period January to May 1971. The Remedial group made significantly greater gains than did the Developmental group in their reading knowledges as assessed by their teachers, but the reading habits of the Remedial group were significantly lower than those of the Developmental group both at the beginning and at the end of the study.

None of these gains can be directly attributed to the Borg-Warner System 80 technology because it was only a part of the total reading program. However, almost all of the pupils thought that the machine was fun to work with and that it helped them learn new letters and new words. (See Tables 5 and 6)

T-tests used the mean scores of the pre-post tests in the Borg-Warner kits of programmed reading materials. A group of 18 of the 46 Developmental pupils who completed Kits A/B of the "Learning Letter Names" series showed statistically significant gains. (See Table 5) The Remedial students who completed each of the first four kits of the "Reading Words in Context" series made statistically significant gains in Kits A, B, and C, but not on D. (See Table 5) While no group demonstrated 100 percent mastery over the posttest material of any kit, the remedial students had an error rate of only 10 percent or less on the posttests for each of the kits in the word series. These facts suggest two questions which cannot be answered in this study but which would be relevant to an analysis of cost-effectiveness: What is an acceptable performance criteria on a given posttest before a pupil begins working on the next kit of materials? Is there a pretest performance level that would negate the value of using the Borg-Warner System 80 as supplementary teaching technology in view of the cost involved?

It was also noted that the mean pretest error of the Remedial students progressively decreased as the words in the context kits increased in difficulty, suggesting that these students were acquiring skills needed to operate the equipment effectively, such as aural and visual discrimination and the ability to follow directions.

Prior to the introduction of the Borg-Warner System 80 technology into the classrooms of the 14 selected schools in January 1971, the teachers of the sample students indicated in their reaction to a workshop on the equipment that their expectations for the audio-visual machine and the programmed reading materials were very high. Their attitudestoward the program were favorable and they thought they were well-equipped to integrate this tool for supplementary Developmental and Remedial instruction into their reading programs. (See Tables 7 and 8)

In May 1971 these same teachers and others from the 14 selected schools, after working with the Borg-Warner System 80 reading materials for four months, completed a final evaluation questionnaire. Their responses indicated that 45 percent of the sample students used the Borg-Warner machine about once a day, while 41 percent more used it less than once a day but more than once a week. They noted that 36 percent of the pupils spent about 10 to 14 minutes at the machine each time they used it, while another 31 percent spent 15 to 19 minutes. Only a few spent less time but 14 percent spent more than 25 minutes at a time. (See Table 9) The teachers indicated that they were pleased with the Borg-Warner System 80 as a self-motivating and enjoyable teaching method and as a tool to be used in conjunction with any beginning reading program. They thought the program had achieved "to a great extent" the goals set for it in terms of teaching the pupils their alphabet and the recognition of words in context. (See Table 10) They considered the program an excellent method for individualizing instruction and thought it helped develop self-confidence in the children. (See Table 12) The teachers thought that two things would improve the program: 1) the availability of aides to help administer the program; and 2) the availability of the programmed phonics materials to bridge the gap between the alphabet series and the words in context series.

Of the objectives listed at the beginning of this report for the Borg-Warner System 80 program, only one remains untested by this evaluation: "To create a desire and a love for reading on the part of the student." The results of the pre-post student interviews did, however, indicate that the students' attitudes toward reading improved and that that gain was statistically significant. However, the role of the Borg-Warner System 80 in this improvement process is only conjecture. That the other objectives listed were fulfilled is supported by the evidence presented in this report: Students did learn to recognize the names of letters in the alphabet and to recognize high-frequency nouns in context. The equipment did provide an enjoyable and self-motivating teaching teaching method, it did aid the teacher in individualizing reading instruction, and aid in remedial as well as developmental reading instruction. Further it was a tool that the teachers thought could be used

in conjunction with any beginning reading program.

Some additional conclusions that the evaluation team thinks are justified in light of the evidence gathered here are the following:

1. The Borg-Warner System 80 audio-visual unit and the accompanying kits of programmed reading materials became highly favorable influences in the reading environment of the pupils using it.

2. The Borg-Warner System 80 reading materials were useful supplementary teaching tools for both remedial and developmental reading instruction.

3. The alphabet materials of Kits A and B of the "Learning Letter Names" series are most suitable for children who already have some familiarity with the alphabet.

4. The "Reading Words in Context" series appears to be more applicable to remedial reading instruction for intermediate students than as a supplement to developmental instruction in grades one and two.

5. A large gap exists between the skills needed for the "Learning Letter Names" series and the "Reading Words in Context" series, making it practically impossible for a pupil to progress from one to the other directly.

6. The administration of the Borg-Warner System 80 while not excessively time consuming can be distracting for the teacher while regular classroom lessons are in progress.

7. Some classroom teachers found it difficult to schedule pupils on the System 80 continuously throughout the day. Continuous scheduling functioned more smoothly in the reading centers where pupils could come one by one throughout the day.

VI. Recommendations

On the basis of the data obtained in this evaluation, the evaluation team recommends the following for consideration in future decision making relating to the Borg-Warner System 80 program:

1. Purchase of subject matter kits should be consistent with decisions about the use of the machines. For example, if a school wants to use the machines to supplement developmental reading at the primary level, the evidence here would support the purchase of the alphabet series and the phonics

series. If however, the emphasis was to be on remedial reading at the intermediate level, then the word series would appear to be the most functional.

2. Schools using the "Learning Letter Names" series for developmental reading instruction in the primary grades should consider purchasing the kits of phonics material now available from the Borg-Warner Corporation to follow the alphabet series and precede work in the "Reading Words in Context" series.

3. Other subject matter kits of programmed materials, those designed to develop specific reading skills such as spelling, should be examined and evaluated by teachers using the equipment.

4. Distribution of System 80 equipment in a school should allow for maximum usage of the technology.

    a. The audio-visual units could be placed in a central location for remedial instruction or in a first grade classroom for developmental instruction in those cases where the children are already able to cope with the alphabet discriminations.

    b. Equipment might be shared between primary and intermediate classrooms where teachers choose to use the machines for only part of the day. A first grade teacher might conduct a developmental program with the alphabet or phonics kits, while a fourth grade teacher might wish to use the equipment for remedial instruction with the word series -- both on a parttime basis.

5. A more effective system of repairing equipment should be devised so machines do not stand idle for months before repairs are made.

6. If at all possible aides should be made available to assist teachers using the Borg-Warner System 80, whether in self-contained classrooms or in reading centers. These aides could be intermediate students, parent volunteers, pupil aides, as well as paraprofessionals. For example, an intermediate remedial student, familiar with the System 80, could assist a primary teacher with her developmental program. Some orientation to the equipment should be arranged for all aides.

7. Discussions among the teachers using the Borg-Warner System 80 equipment and with those considering purchasing it, such as the discussion meeting held in May 1971 sponsored by the Department of Language Arts, should be continued periodically. Discussions at least twice a year would be valuable.

VII. Appendices

Appendix A

Expansion of Table 4, By Classes

Table A: Pre-Post Reading Attitude of Pupils in Borg-Warner Sample, By Group, By Class

Table B: Pre-Post Reading Knowledge of Pupils in Borg-Warner Sample, By Group, By Class

Table C: Pre-Post Reading Habits of Pupils in Borg-Warner Sample, By Group, By Class

Table A
Pre-Post Reading Attitude of Pupils in Borg-Warner Sample,
By Group, By Class
(From Student Interview)

School and Group	Number In Class	Pre Mean	Post Mean	Mean Difference	t-score	Level of Significance
A. Developmental						
1. J.F. Cook	6	48.5	61.3	11.2	7.288	5%
2. Eckington (1)	6	30.0	62.3	12.8	1.780	-
3. Eckington (2)	4	56.0	66.0	10.0	3.184	5%
4. Emery (1)	6	65.3	70.7	5.3	1.812	-
5. Kenilworth (1)	5	48.0	56.6	5.4	.714	-
6. Kenilworth (2)	8	60.6	64.6	4.0	2.573	5%
7. Kingsman (1)	7	54.4	67.9	13.4	3.950	5%
Total	42	53.8	64.4	10.6	5.206	5%
B. Remedial						
1. Emery (2)	6	54.7	61.3	6.7	4.724	5%
2. Kingsman (2)	7	64.6	65.3	.7	.342	-
3. Tyler	8	59.1	66.8	7.6	2.590	5%
4. Walker-Jones (1)	6	57.0	59.3	2.3	.896	-
5. Walker-Jones (2)	5	56.8	55.0	- 1.8	.424	-
Total	32	58.7	62.3	3.5	2.454	5%

Table B
Pre-Post Reading Knowledge of Pupils in Borg-Warner
Sample, By Group, By Class
(From Teacher Questionnaire)

School and Group	Number In Class	Pre Mean	Post Mean	Mean Difference	t-score	Level of Significance
A. Developmental						
1. J.F. Cook	7	19.1	22.0	2.6	3.573	5%
2. Eckington (1)	6	19.5	23.2	2.0	.883	-
3. Eckington (2)	4	20.3	26.5	6.3	4.125	5%
4. Emery (1)	7	16.9	22.9	6.3	2.898	5%
5. Kenilworth (1)	6	11.0	17.5	6.5	2.600	5%
6. Kenilworth (2)	8	22.0	26.5	4.5	5.325	5%
7. Kingsman (1)	7	23.4	24.7	1.3	2.140	-
Total	45	19.0	23.3	4.1	6.243	5%
B. Remedial						
1. Emery (2)	5	16.4	25.8	9.4	5.374	5%
2. Kingsman (2)	8	15.3	25.5	10.3	7.618	5%
3. Tyler	8	14.8	19.6	4.9	3.313	5%
4. Walker-Jones(1)	8	14.4	24.4	10.0	12.845	5%
5. Walker-Jones(2)	6	17.0	23.0	6.0	2.879	5%
Total	35	15.4	25.2	8.1	11.109	5%

Table C
Pre-Post Reading Habits of Pupils in the Borg-Warner Sample,
By Group, By Class
(From Teacher Questionnaire)

School and Group	Number In Class	Pre Mean	Post Mean	Mean Difference	t-score	Level of Significance
A. Developmental						
1. J.F. Cook	7	41.6	45.0	3.6	1.735	-
2. Eckington (1)	6	42.6	40.3	-2.3	1.024	-
3. Eckington (2)	4	50.3	51.5	1.3	.297	-
4. Emery (1)	7	38.1	37.9	-1.4	.079	-
5. Kenilworth (1)	6	33.2	42.5	9.3	3.630	5%
6. Kenilworth (2)	8	45.6	55.5	9.9	3.320	5%
7. Kingsman (1)	7	41.3	41.0	-4.2	.676	-
Total	45	41.5	44.8	3.3	2.962	5%
B. Remedial						
1. Emery (2)	5	36.0	46.6	10.6	2.582	-
2. Kingsman (2)	8	34.6	36.5	1.9	.982	-
3. Tyler	8	25.1	29.1	4.0	1.728	-
4. Walker-Jones (1)	8	32.1	37.1	5.3	2.966	5%
5. Walker-Jones (2)	6	29.0	35.8	6.8	1.335	-
Total	35	31.1	36.3	5.2	3.973	5%

Appendix B

Pupil Questionnaire

Pupil Questionnaire
Department of Research and Evaluation
Division of Planning, Research and Evaluation

Name_____Sex____Age____Grade____

School_____Program_____Teacher_____

Part I. Adapted from Dutton's Pupil Attitude Scale

Items	Always	Sometimes	Never
Negative Value	1	3	5
Positive Value	5	3	1

	Always	Sometimes	Never
1. I enjoy working with the letters of the alphabet.			
2. I get tired of learning the letters of the alphabet.			
3. I feel I know the names of the letters of the alphabet.			
4. I get tired of working with words.			
5. I try to learn new words.			
6. Learning new words is hard.			
7. Learning new words is fun.			
8. I like reading.			
9. I am afraid to try to read.			
10. I enjoy reading other books outside of class.			
11. It is hard to learn to read.			
12. I want to read better.			
13. I'd rather do anything than read.			
14. Reading makes me happy.			
15. I get tired of reading			

Appendix C

Student Checklist

Department of Research and Evaluation
Division of Planning, Research and Evaluation
Student Checklist

Name_____Sex_____Age_____

School_____ Program Developmental_____ Remedial_____

Teacher_____ Grade _____ Reading Level_____

Please use the following scale to rate the student in the areas listed below. Please respond as truthfully as possible to all items. Use a check in the appropriate column.

Very Poor	Poor	Fair	Good	Very Good
1	2	3	4	5

1	2	3	4	5

I. Reading Knowledge

1. recognition of letter names
2. recognition of capital letters
3. recognition of small letters
4. basic primary level sight vocabulary
5. basic primary reading vocabulary
6. ability to understand whole sentences and paragraphs

II. Reading Habits and Attitudes

1. interest
2. attention span
3. attendance
4. self motivation
5. self motivation on Borg-Warner machines
6. ability to work independently

Part II continued

	1	2	3	4	5
7. ability to follow instructions					
8. eagerness to participate					
9. self confidence					
10. progress					
11. outside reading habits					
12. overall behavior					

Appendix D

Student Progress Record

Borg-Warner Systems 80 Program
Student Record

Directions: Please record the number of items receiving one or more incorrect responses

Student's Name	PRETEST									POSTTEST								
	A/B	A	B	C	D	E	F	G	H	A/B	A	B	C	D	E	F	G	H

Appendix E

Borg-Warner System 80
Training Workshop Questionnaire

Borg-Warner Systems 80
Reading Workshop

Name_____

Position_____Grade Taught_____

Total number of years of teaching experience_____
(exclude student teaching or internship experience)

Instructions: Respond to each question by checking the appropriate column.

Part I

To what extent did you receive during the workshop information on which you the teacher can base decisions about:

	To A Great Extent	To Some Extent	Not At All
1. Programming children in the use of the material			
2. Determining the amount ot time each pupil should spend in the program daily			
3. Determining which children should use the Borg-Warner system			
4. Evaluating pupil progress			
5. Recording pupil progress			

Part II

	Yes	No	Undecided
1. Do you think the Borg-Warner system will be effective in teaching alphabet names?			
2. Do you think the Borg-Warner system will be effective in teaching recognition of words in context?			

Part II (continued)

	Yes	No	Undecided
3. Do you think the Borg-Warner system will be effective in teaching high frequency vocabulary words?			
4. Do you think the Borg-Warner system will aid in individualizing instruction?			
5. Do you think the Borg-Warner system will be self-motivating?			
6. Do you think your pupils will enjoy working with the Borg-Warner system?			
7. Do you think the Borg-Warner system will aid in the development of positive reading attitudes?			
8. Do you think the Borg-Warner system will be a useful tool in a developmental reading program?			
9. Do you think the Borg-Warner system will be a useful tool in remedial instruction?			
10. Do you think you have enough information to implement this			

Part III

1. How would you characterize your present attitude toward the use of the Borg-Warner system?

_____ highly favorable

_____ favorable

_____ indifferent

_____ unfavorable

_____ extremely critical

Part III (continued)

2. How would you characterize your present understanding of the use of the Borg-Warner system?

_____ very good

_____ good

_____ fair

_____ poor

_____ very poor

Appendix F

Teacher Questionnaire, Final Evaluation
Borg-Warner System 80

Division of Planning, Research and Evaluation
Department of Research and Evaluation

Teacher Questionnaire -- Borg-Warner System 80

School_____Date_____

Position: Regular Classroom___Reading Specialist___Other (specify)_____

Years teaching experience (other than student teaching or internship)_____

Use of Borg-Warner Machines: Grade Level(s)___Remedial___Developmental____

As you have participated in the Borg-Warner System 80 program, your reactions are important to an overall assessment of the program. Please respond candidly to all the items on this questionnaire.

1. To what extent did each child use the machines? Check the appropriate response.

   a. Average number of times per week:

10 or more	_____	4 to 6	_____
7 to 9	_____	1 to 3	_____

   b. Average number of minutes each time:

25 or more	_____	10 to 14	_____
20 to 24	_____	5 to 9	_____
15 to 19	_____	1 to 4	_____

2. To use the reading machine effectively in your classroom, what prior experience would be most helpful? Check all that apply.

   a. ½ day orientation workshop _____
   b. ½ day training workshop _____
   c. 1 day orientation workshop _____
   d. 1 day training workshop _____
   e. Other (specify) _____

3. Did you receive all the support you needed in working with the machine from:

   a. Central Office Yes_____ No_____

   b. Your Building Yes_____ No_____

   (Comment, if any)

4. Do you consider this machine very durable? Yes_____ No_____
(comment, if any)

5. Did you have an aide to help with this system? Yes_____ No_____

If Yes, check the category of person(s) working directly with the children at the machines:

a. parent volunteer tutors _____
b. regular teacher aides _____
c. pupil tutors _____
d. other (specify) _____

If No, indicate the extent to which the program would be improved with the services of an aide:

a. Not at all _____
b. To some extent _____
c. To a great extent _____

6. The Borg-Warner system proposes to accomplish the following objectives. How well do you think this machine was able to do the following for your class?

Specific Objectives:	Totally	To A Great Degree	To Some Degree	Not Quite	Not At All
1. To teach student to recognize the names of letters in the alphabet.					
2. To teach recognition of the capital and small forms of the letters in the alphabet.					
3. To provide a method for teaching and learning that is both self-motivating and enjoyable.					
4. To create a desire and a love for reading on the part of the student.					
5. To teach recognition of a fundamental vocabulary of approximately 200 service words and 100 high-frequency nouns in context.					
a. Words that appear frequently in most reading matter					
b. Words that appear frequently in most primary-level basal readers					

Totally	To A Great Degree	To Some Degree	Not Quite	Not At All

6. To aid the teacher in individualizing reading instruction.
7. To aid in remedial as well as developmental reading.
8. To provide a tool that may be used in conjunction with any beginning reading program.

7. Give your opinion by rating the following items. Check the appropriate column where applicable.

	Excellent	Good	Fair	Poor	Not Applicable
a. The machine as an easy device to operate					
b. Student retention of what is taught by the machine					
c. The effectiveness of the machine for:					
1) girls					
2) boys					
3) 6 to 7 year olds					
4) 8 to 9 year olds					
5) 10 to 11 year olds					
6) 12 to 13 year olds					
7) developmental reading					
8) remedial reading					
d. The machine as an aide to reducing truancy					
e. The machine as a motivator in creating good reading habits					

8. Rate the overall effectiveness of the Borg-Warner System 80 program by placing an "X" in the appropriate box on the scale below.

Excellent			Good			Fair			Poor		
12	11	10	9	8	7	6	5	4	3	2	1

9. List any specific weaknesses involved in the use of the System 80 program.

10. List any specific strengths involved in the use of the System 80 program.

11. List other comments concerning the overall usage of the Borg-Warner System 80 program that would be helpful to future planning.